UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,527	03/03/2004	Dimitri Saey	1875.4880001	3355

26111 7590 11/14/2007

STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
1100 NEW YORK AVENUE, N.W.
WASHINGTON, DC 20005

EXAMINER	
LEE, SIU M	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
11/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/791,527	SAEY, DIMITRI	
	Examiner	Art Unit	
	Siu M. Lee	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7-11,14-16,19-23 and 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7-11,14-16,19-23 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 7, filed on 8/30/2007, with respect to Rejections under 35 U.S.C. § 112 have been fully considered and are persuasive. The 35 U.S.C. § 112 rejections of claims 10 and 21 have been withdrawn.

2. Applicant's arguments filed on 8/30/2007 have been fully considered but they are not persuasive.

(1) Regarding claim 1, 4-6, 8, 11-13, 15, 17-20 and 23-25.

Applicant's argument:

The Peeters does not teach or suggest dynamically changing the grouping of carriers and transmitting parameters to other modems describing changed groupings. Peeters groups carriers a priori. There are no changes with changing conditions. Peeters describes the transmitting and computing constellation information may be carried out during modem operation but does not refer to carrier grouping.

Examiner's response:

In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019.

In paragraph 0023, it states, "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information.

From this two paragraphs (paragraph 0021 and 0023), the grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier.

(2) Regarding claims 2-3, 9-10, 16, and 21-22:

Applicant's argument:

Peeters does not teach or even suggest dynamically changing the grouping of carrier and transmitting parameters to other modem describing changed groupings.

Peeters groups carriers a priori. There are no changes of carrier groups with changing conditions. Peeters does teach computing and transmitting constellation information (not carrier grouping) carried out during modem operation.

Examiner's response:

In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019.

In paragraph 0023, it states, "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according

to the change of the channel characteristic, that is the dynamically updating of the constellation information.

From this two paragraphs (paragraph 0021 and 0023), the grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4, , 8, 11, 15, 19-20, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Peeters et al. (US 2001/0012783 A1).

(1) Regarding claim 1:

Peeters et al. discloses a modem comprising:

a carriergroup transmitting means (BiGi_Tx of Rx modem in figure 1) coupled to a transmission channel (Line (twisted pair) in figure 1);

a carriergroup receiving means (DMOD of Rx modem in figure 1) coupled to the transmission channel (Line (twisted pair) in figure 1) for receiving parameters relating to a plurality of carriers in the transmission channel; and

a carriergrouping means (CHANNEL and BiGi_PROD of Rx modem in figure 1), coupled to the carriergroup transmitting means and to the carriergroup receiving means, for determining at least one carriergroup parameter (constellation information message that contains the bit loading information and the gain information, paragraph 0019, lines 13-16) and at least one dynamically variable size carrier group for the plurality of carriers in the transmission channel based on the parameters received by the carriergroup receiving means (channel analyzing circuitry CHANNEL receives a predetermined sequence from the Tx modem and measures the signal to noise ratio for each carrier, paragraph 0019, lines 4-7) (In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019. In paragraph 0023, it states "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will

include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From this two paragraphs (paragraph 0021 and 0023), it is inherent that he grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier);

wherein the carriergroup transmitter means transmits at least one message to the transmission channel comprising the at least one carrier group parameter and the at least one carrier group (the constellation information message is transmitted over the phone line LINE from the constellation information transmitter BiGi_Tx to the constellation information receiver BiGi_RX, paragraph 0019, lines 17-20) .

(2) Regarding claim 8:

Peeters et al. discloses a method for grouping a plurality of carriers in a DMT communication system, the method comprising the steps of:

determining at least one dynamically variable sized carrier group for the plurality of carriers (after channel analysis, the carriers are grouped in subset of carriers, paragraph 0021, lines 3-6) (In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message

BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019. In paragraph 0023, it states "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From this two paragraphs (paragraph 0021 and 0023), it is inherent that the grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier);

determining at least one carriergroup parameter for the at least one carrier group (the constitution of the subsets of carriers is determined); and

sending at least one message comprising the at least one carriergroup parameter (the subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be reported via message, paragraph 0021, lines 7-10).

(3) Regarding claim 11:

Peeters et al. discloses wherein the step of determining a carriergroup parameter for the carriergroup further comprises the step of determining at least one carriergroup bitloading for the at least one carriergroup (the constellation information message that indicates bit and gain assignment to the upstream carriers is thus also kept short, paragraph 0022, lines 4-6).

(4) Regarding claim 15:

Peeters et al. discloses a method for grouping a plurality of carriers in a DMT communication system, the DMT communication system comprising a near end (Rx modem in figure 1) and a far end modem (Tx modem in figure 1), the method comprising the steps of:

determining at least one dynamically variable sized carriergroup from the plurality of carriers (the 4096 carriers are grouped in a 8 group subsets each consisting of 512 carriers) (In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal

to noise ratio as mentioned in paragraph 0019. In paragraph 0023, it states "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From this two paragraphs (paragraph 0021 and 0023), it is inherent that the grouping of the carriers and transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier);

determining a carriergroup signal-to-noise ratio for the at least one carriergroup (the channel analyzing circuitry CHANNEL upon transmission of a predetermined sequence measures the signal-to-noise ratio (SNR) for each carrier f_0 to f_{4095}, paragraph 0019, lines 4-13);

determining a carriergroup bitloading and a carriergroup gain for the at least one carriergroup based on the carriergroup signal-to-noise ratio (this signal-to-noise ratio values are used by the constellation information producer to determine for each carrier subset the number of bits that can be modulated on each carrier of this subset and the gain where each carrier of this subset should be transmitted with (paragraph 0019, lines 8-13); and

using the carriergroup bitloading and the carriergroup gain for the at least one carriergroup for transmitting messages from the near end modem to the far end modem (the set of parameter values for a carrier subset may consist of a bit number and a gain value, as a result carriers belonging to the same subset will be modulated with an equal amount of bits and will be transmitted with the same gain, paragraph 0008).

(5) Regarding claim 19:

Peeters et al. discloses a method wherein the communication system is VDSL system (paragraph 0019, lines 1-2).

(6) Regarding claim 20:

Peeters et al. discloses a modem for grouping a plurality of carriers in a DMT communication system coupled to a far-end modem via a transmission channel (figure 1, the Rx modem and the Tx modem), the modem comprising:

carriergrouping means (channel analyzing circuitry (CHANNEL) in the Rx modem in figure 1, paragraph 0019, lines 5) for determining multiple dynamically variable sized carrier groups for the plurality of carriers and for determining at least one carriergroup parameter for each of the multiple carrier groups (after channel analysis (measuring of

the signal-to-noise ratio of each carrier), the carriers are grouped in subsets of carriers where the same amount of bits will be allocated, paragraph 0021, lines 3-5) (In paragraph 0021, it states that the carrier subsets of carriers typically will not contain the same number of carriers and the constitution of the subsets will be report via messages (possibly via the constellation information message BiGi) from the VDSL receiver to the VDSL transmitter. From this paragraph, we know that the number of carriers in a carrier subset is not fixed and will varies according to the measured signal to noise ratio as mentioned in paragraph 0019. In paragraph 0023, it states "the transmitting and computing bits and gains information according to the present invention may be applied during operation to adapt the carrier constellation according to changes of the channel characteristics. The carrier constellation as mentioned in paragraph 0005, "this message also may contain the description of the carrier subsets". This told us that the generation of the constellation (information including the description of the carrier subsets, the number of bits to be load in each carrier subset and the gain for each of the carrier subset) can be preformed during the operation to adapt to the changes of the channel characteristics, that will include the measure of the signal to noise ratio for each carrier in order to group the carriers into difference carrier subsets. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention that as the channel characteristic is always changing, the update of the constellation information will be perform according to the change of the channel characteristic, that is the dynamically updating of the constellation information. From this two paragraphs (paragraph 0021 and 0023), it is inherent that the grouping of the carriers and

transmitting parameters to other modems are perform dynamically and the size of each carrier subset will varies depending on the signal to noise ratio of each carrier); and

carriergroup transmitting means (BiGi Tx of Rx modem in figure 1) for transmitting messages (constellation information) comprising the at least one carriergroup parameter to the far-end modem (Tx modem in figure 1) via the transmission channel (line in figure 1), to enable the far-end modem to send and receive messages using the multiple carrier groups (the bit loading and the gain information contain in the constellation information is being used in the Tx and Rx modem for transmission, paragraph 0008).

(7) Regarding claim 4 and 23:

Peeters discloses wherein the carriergroup parameter is a carriergroup bitloading parameter (the set of parameter value for a carrier subset may consist of a bit number, carrier belonging to the same subset will be modulated with an equal amount of bits, paragraph 0008).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-3, 9-10, 16, 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. (US 2001/0012783 A1).

(1) Regarding claims 2, 9, and 21:

Peeters et al. discloses all the subject matter except explicitly disclose wherein the at least one carriergroup parameter transmitted by the carriergroup transmitting means is a carriergroup SNR parameter for the plurality of carriergroup.

However, Peeters et al. discloses wherein the at least one carriergroup parameter transmitted by the carriergroup transmitting means is a bit loading number for the carriergroup for the plurality of carriergroup (paragraph 0020, lines 3-8).

It would have been obvious to one of ordinary skill in the art at the time of invention to realize that the bit loading for a carrier is proportional to the signal-to-noise ratio; with a high SNR, the carrier can transmit more bits; therefore the bit loading information for a carriergroup is another from of representation of the signal-to noise ratio. In the instant application, the far end modem receives the transmitted SNR parameter and uses the SNR for determining the bit loading information for the carrier group. Peeters et al. discloses that the near end modem used the measured SNR to determine the bit loading information and then transmitted the bit loading information to the far end modem. Therefore, it would have a matter if obvious design choice to one of ordinary skill in the art.

(2) Regarding claim 3, 10, 16, 22:

Peeters further discloses that a bit number at which the carrier with the lowest index in the subset should be transmitted (paragraph 0020, lines 6-7) (the examiner interpret that the lowest index in the subset means the carrier with the lowest bit loading

number, it is means the carrier with the lowest signal-to-noisés ratio, which is the worst case SNR).

7. Claims 7, 14 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peeters et al. (US 2001/0012783 A1) in view of Gardner et al. (US 7,042,367 B2).

Peeters et al. further discloses that the carriers belonging to the same subset will be modulated with an equal amount of bits and will be transmitted with the same gain (paragraph 0008). Peeters fails to explicitly discloses the at least one carriergroup parameter is used to set up a tone encoder in a far end modem.

However, Gardner et al. discloses wherein at least one message comprising the at least one carriergroup parameter is used to set up a tone encoder in a far end modem (the tone order and constellation encoder 84 in figure 5 assign bins to the data and encodes the data, the number of bits per bin and the type of QAM coding to be performed were previously determined during initialization, subchannel that contains a high level of noise (lower signal to noise ratio) will be assigned to carry less data bits than a less attenuated subchannel, after the data bits are assigned to each bin, QAM constellation encoding takes place, column 8, line66 – column 9, line 12).

It is desirable to for one message comprising the at least one carriergroup parameter is used to set up a tone encoder in a far end modem because it can make sure that the data rate requirement for transmission is being satisfied (column 13, lines 44-53). Therefore, it would have been obvious to one of ordinary skill in the art at the

time of invention to employ the teaching of Gardner et al. in the method of Peeters et al. to improve the reliability of the method.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Siu M. Lee whose telephone number is (571) 270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Siu M Lee
Examiner
Art Unit 2611
10/30/2007

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER